Software Radio - Technology and Requirements

Topic: Defining the goals for a software radio (or, what would go into a statement of work to define a proposed architecture and development approach for a software radio?)

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1 – What are the top level requirements and goals/desires for a software radio? (i.e what applications and needs should software radios address in communications, navigation and/or surveillance?)

- Maximize and leverage the accomplishments of the SDR forum, the software communications architecture, the Joint Tactical Radio System program, the NEXCOM program, and commercial wireless industry

- Develop a concepts of operations for different applications
  - Identify the long term problems and potential benefits for all users of the NAS that SDR can address
  - Define the evolutionary path for the next generation after NEXCOM
  - Define a long term evolutionary path for integrated C, N, and/or S functions for all users in NAS in long term

- Strive for open architectures and global standardization
  - Interoperability with international standards and interface standards
  - Pursue a layered approach, with scalability and extensibility

Question 1 (Concluded)

- Identify cost/benefit for airlines and users of the NAS
  - Classification of cost benefits based on classes of aircrafts, mission and ownership
  - Near term benefits to users (e.g. maintainability, Reduced Logistics
  - Long term benefits (e.g. Enabler of transition toward NAS enhancement and ICNS)
- Identify system reliability and availability of the equipment
- Enable expandable scope of capabilities via SDR to potentially include communication, navigation, and surveillance functions
- Proactively plan for implementation with systems safety assurance and certification
  - Compliance with current standardization framework and cognitive of other emerging standards

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2 - What are the prioritized challenges to development and infusion of software radios?

- End user demand and acceptance
  - Economics
- Impact on system safety
  - Methodology of software and hardware certification
  - Effect on other safety critical avionics (C, N, and S functions)
  - How to certify the SDR and it's impact on other safety
- Policy and/or cultural issues
- Technical challenges
  - Cost sensitivity based on market demand
  - Size sensitivity based on application (e.g. Miniaturization)
  - Reliability, Flexibility, Upgradeable and Extensibility
  - Avionics for different classes of aircraft
- Roadmap for development and infusion of SDR into NAS and TSD

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3 - What are the technical and cost requirements? (i.e. what frequency range should be covered, what functions, what waveforms, what cost targets, etc.)

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4 - What is the recommended approach to reaching the goals? (i.e. what is the transition roadmap and timeframe for major milestones?)

- Detail survey of the existing technology (JTRS, Commercial wireless and existing avionics)
  - Benefits and advantages
  - Lifetime of the existing technology
  - Integration with future technology
- Cost benefit analysis
  - Elation to FAA for target system description
- System safety assessment and analysis
- Twenty year roadmap for radio technologies

Other Issues Parking Lot

- Should we develop a unified certification approach for software platforms?
  - Whom do we approach for that? OSTP,NSC,FCC, FAA?
- Should FAA ask RTCA to develop SDR standard?
- Should AEEC (and therefore the avionics suppliers and airlines) develop a common hardware standards?
- Is backward compatibility with legacy waveforms always a requirement?